

# PATENT SPECIFICATION

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272,926

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Complete Accepted: March 15, 1928.

COMPLETE SPECIFICATION.

## Improvements in or relating to Air Preheaters for Furnaces and the like.

We, SIEMENS - SCHUCKERTWERKE GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, a German company, of Berlin-Mitte, Germany, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention relates to air preheaters for furnaces and the like.

In the construction of air preheaters a problem arises to accommodate as large a heat transmitting surface as possible in a given space. Iron sheets or thin plates are usually employed for the construction of air heaters and these sheets or plates must naturally be joined together so closely that the air and the flue gases cannot become mixed. It has therefore been suggested to join the edges of the sheets or plates by welding. Welding produces perfect joints, but the process is expensive and in the case of thin sheets comparatively difficult.

The present invention relates to air preheaters composed of metal plates, wherein the individual plates are separated from each other by spacing strips or fillets acting at the same time as packing, and the invention is characterized by the fact that flanges are provided on the plates which engage, upon pressing the individual elements together, overlap the packing strips or fillets, and thus seal the abutment joints between the individual elements. This construction of the air preheaters renders the abandonment of welding possible and enables the employment of means of connection, which permit of the sheets or plates composing the heater being at any time and easily detached.

Since the sheets are comparatively thin, as already pointed out, and it is necessary to employ plates of large area, it may happen that the sheets warp due to heat stresses. In order to avoid contractions being set up in the gas passages, further distance bars or strips are placed in the compartments or chambers which preferably are so shaped that they serve at the same time as guide members for the gases

(air, flue gases) to be conducted through the chambers.

In the drawings affixed hereto an embodiment of the invention is illustrated by way of example.

In the drawings:—

Figure 1 is a perspective view of two plates for building up the improved air heater, side by side.

Figure 2 is a perspective view of a unit composed of two plates.

Figure 3 is a cross-section through a base upon which the heater is erected.

Figure 4 is a perspective view of a complete heater, and

Figure 5 is a detail in cross-section.

Referring to Figure 1 of the drawings it will be observed that each plate consists of a plate 1, the distance bars 2<sup>1</sup> and 2<sup>11</sup>, and the distance bars 3<sup>1</sup> and 3<sup>11</sup> which latter form guide members for the gases. Bolts are introduced through the holes 4 and the plates are drawn together as shown in Figure 2. The rails 2<sup>1</sup> and 2<sup>11</sup> seal the chambers along their longitudinal edges. It is, however, necessary to provide a packing at the top as well as at the bottom. For this purpose distance bars 6<sup>1</sup> and 6<sup>11</sup> are provided and the sheets 1 are furthermore provided with bent over flanges 5<sup>1</sup> and 5<sup>11</sup> so that when the plates are assembled the flanges 5<sup>1</sup> engage the top of the distance bars 6<sup>1</sup> and the flanges 5<sup>11</sup> the bottom of the distance bars 6<sup>11</sup>. In order to prevent gases from penetrating at the air inlet or outlet side, flanges or bent over portions 7<sup>1</sup> which pass across the distance bars 2<sup>1</sup> are also provided on the sheets 1.

Referring to Figure 3 which shows an example of the installation of the air heater which enables a particularly good seal, it will be observed that the heater is placed upon a grate-like part 8 and by its weight forces the flanges 5<sup>11</sup> tightly against the distance bars 6<sup>11</sup>. A similar grate-like part may in like manner be placed on the top of the heater which forces the flanges 5<sup>1</sup> by gravity against the distance bars 6<sup>1</sup>. For the assembly of the air heater it is of advantage to combine the sheets or plates into individual units I and II and to place them

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into a common box 12. The chambers are in this arrangement sealed against one another, but care must be taken that the units are also sealed against the box itself. For this purpose bars 9 are provided upon the wall of the box and are forced against the edges of the heater units by springs 10 as shown in Figures 4 and 5 of the drawings.

Since the individual chambers of the preheater are of considerable height it is difficult to remove the heater units by lifting them out of the chamber at the top. It is, however, necessary that it should be possible to remove damaged units easily and quickly. To attain this end at least one of the side walls of the box 12 can be made detachable, so that the units I, II may be removed bodily sideways.

On referring again to Figure 3 it will be observed that between the units I and II there is located a flue III, the admission area of which may be varied by means of a damper 11. By setting this damper 11 the preheating temperature may be regulated at will. If the temperature has risen too high it is only necessary to open the damper 11 and thus conduct a portion of the flue gases past the air heater, whereby the preheating temperature drops correspondingly.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An air preheater composed of multiple plates wherein the individual plates are separated from each other by spacing strips or fillets acting at the same time as packing, characterised by the fact that flanges are provided on the plates which upon pressing the individual elements together, overlap the packing strips or fillets, and thus seal the abutting joints between the individual elements.

2. An air preheater according to Claim 1, characterised by the fact that the preheater is erected upon a grate-like base, upon which the flanges or bent-over parts are pressed by the weight of the preheater.

3. An air preheater according to Claims 1 and 2, characterised by the fact that the upper bent-over parts are also loaded by means of a grate-like body.

4. An air preheater according to Claims 1 to 3, characterised by the fact that the units are sealed in relation to the vertical box walls by means of spring loaded plates, which bear against the walls of the box, and bear upon the edges of the units.

5. An air preheater constructed substantially as hereinbefore described with reference to the accompanying drawings.

Dated this 15th day of June, 1927.

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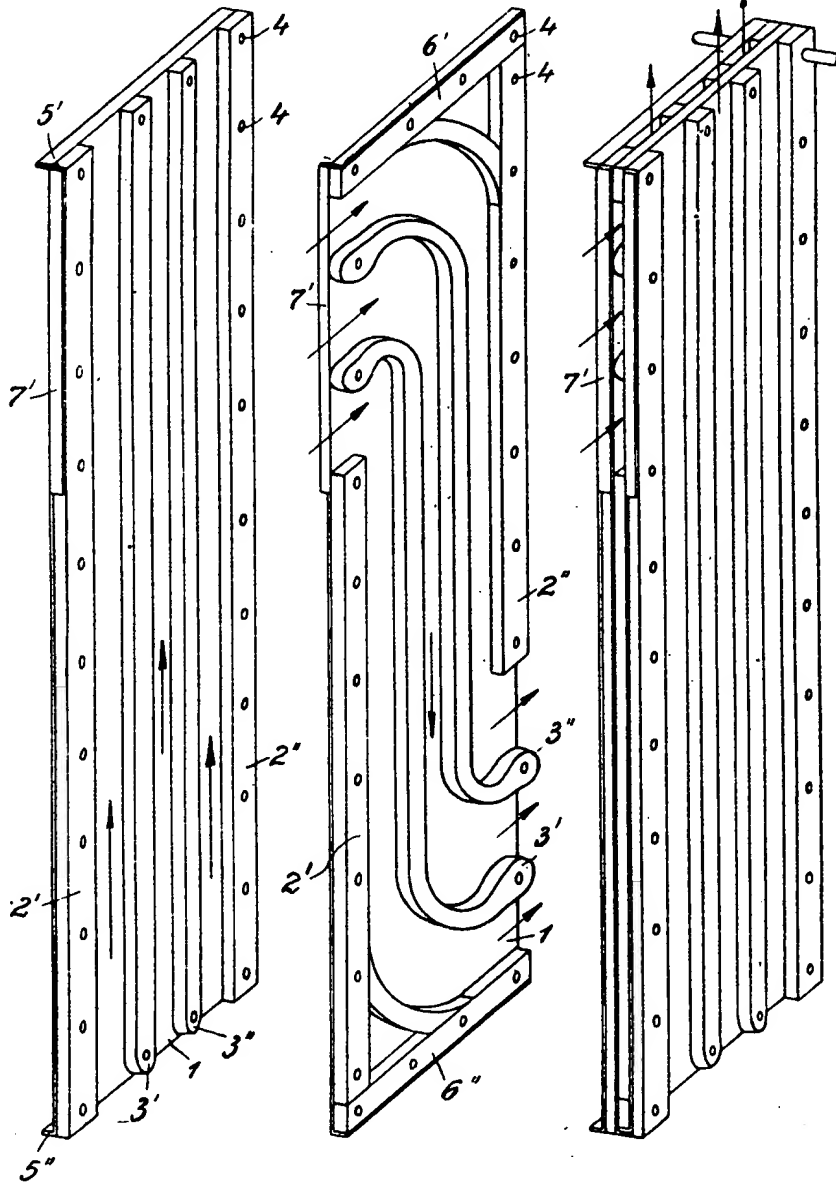
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SHEET

= Ger. #488626

Fig 1 166

Fig 2



[This Drawing is a reproduction of the Original on a reduced scale.]

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257  
245-

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2 SHEETS  
SHEET 2

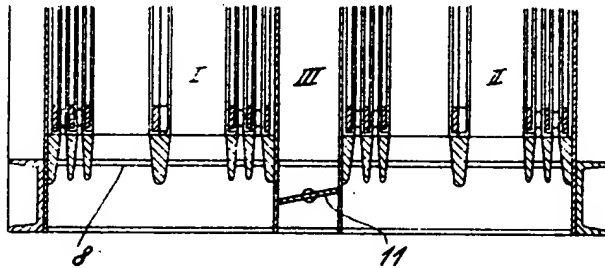


Fig. 3

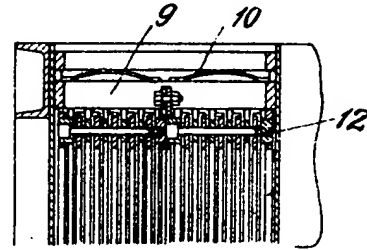


Fig. 5

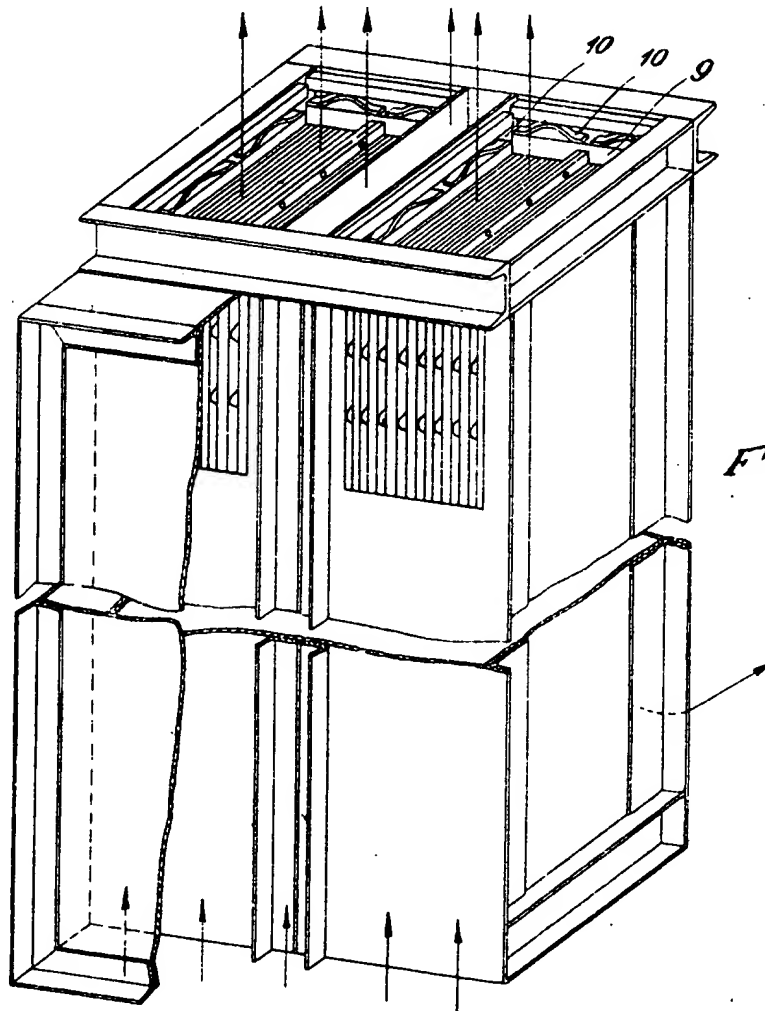


Fig. 4